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ABSTRACT

A proposed model of communicative behavior suggests a series of seven progressively more complex levels of communicative competence: (1) behavior state; (2) recognitory; (3) contingency; (4) instrumental; (5) triadic; (6) verbal-contextual; and (7) verbal-decontextual. Tables define these levels in detail and list their characteristics. Each level is exemplified by particular engagement and termination behaviors. In a study designed to determine whether children follow the proposed model, a total of 68 children between 1 day and 30 months of age were observed while playing with their mothers. Interactions were coded for children's communicative behaviors, and performance criteria were established for mastery of each level of communicative competence. Also noted were the age at which a behavior from a particular level first appeared; the basal age, at which at least one child met the criteria for mastery of a behavior; and the ceiling age, at which all children exhibited mastery of the level. Results indicated that, beginning with level 3, the first appearance of a behavior from a level was concurrent with the basal age for the preceding level. Results supported the proposed model. Estimated age ranges for each level are given. A list of 55 references is provided. Appendixes include definitions of specific termination and engagement behaviors in each of the levels and a copy of the observation coding form. (BC)

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Developmental Changes in Early Communicative Competence

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ABSTRACT

Sixty-eight children from 1 day to 30 months of age were observed in play interaction with their mothers. Communicative behaviors were observed in order to determine if children follow the sequence of levels of communication competence proposed in a model of communication development. First appearance, basal and ceiling ages were established for mastery of each level. The results indicate that communicative development appears to be a sequentially ordered progression in the mastery of successive levels that is both gradual and overlapping. Estimated age ranges are provided for each level. Application of the model for assessment and intervention with young children is discussed.

An infant's early social interactions set the occasion for the acquisition of nonverbal communicative competencies that are considered the antecedents of formal language (Carlson & Bricker, 1982; Golinkoff & Gordon, 1988; Harding, 1983). Models of communicative development have typically focused on the first year of life (Harding, 1983) or from about 9 to 24 months, when children become more intentional and verbal in their use of communicative behaviors (Bates, 1976; Carter, 1979; Halliday, 1975; Sugarman-Bell, 1978; Coggins, Olswang & Guthrie, 1987; Wetherby, Cain, Yonclas, & Walker, 1988; Weatherby, Yonclas & Bryan, 1989). In contrast, a model developed by Dunst (1978, 1981, 1985) and revised by Holdgrafer and Dunst (1986, 1990, 1991) integrates and synthesizes information from a number of sources in order to depict the full range of developmental changes in communication that have been observed during a child's first two and one-half years. The model reflects a broad definition of communication as

> "any overt conventional or nonconventional behavior, whether used intentionally or not, that has the effect of arousing in an onlooker a belief that the child is attempting to convey a message, make a demand or request, or is otherwise attempting to affect the behavior of the onlooker" (Dunst, 1978, p.111).

Specifically, child communication behavior functions to either engage an adult in social interaction or to terminate the interaction (Carlson & Bricker, 1982; Wilcox, 1984). Engagement refers to child behavior that elicits and maintains adult

responsiveness and that has the effect of sustaining infant interaction with the adult. Termination refers to child behavior that interrupts adult responsiveness and that has the effect of providing the child both control over the amount of adult stimulation (Carlson & Bricker, 1982) and the opportunity to re-engage the adult (Wilcox, 1984). Adult contingent responsiveness to the child's preintentional communication behavior appears to facilitate the acquisition of intentional engagement and termination behaviors (Wilcox, 1984; Wilcox, Kouri & Caswell, 1990). Specific categories of intentional communication have been distinquished in children's nonverbal behavior (Chapman, 1981). Children reject offered objects and activities, request objects or actions on objects, and comment on objects in order to direct the other person's attention to them. These intentions are eventually expressed verbally, first in reference to people, objects and events in the immediate context, and later in reference to entities displaced in time and space (Olszewski & Fuson, 1986).

The model is illustrated in Table 1. There are seven progressively more complex levels of communicative competence in which a hierarchial and ordinal relationship (Uzgiris & Hunt, 1975) is assumed between levels. Approximate age ranges for each level were initially derived from the developmental literature. Progression in the mastery of levels is considered to be both gradual and overlapping. Consequently, the child's communicative behavior should reflect a predominate level; however, the appearance of behaviors representative of earlier and more advanced

levels is not precluded. Each level is characterized by a binary classificatory profile of plus (+) and minus (-) signs to indicate the features that distinquish communicative behavior at each level. Definitions of both the features and levels of communicative competence are contained, respectively, in Tables 1 and 2.

Insert Tables 1 and 2

Each level is exemplified by a representative class of engagement and termination behaviors (see Appendix A). Those behaviors have been reported in the developmental literature or were observed in children during preliminary work on the model. They are not considered to be exhaustive. It is important to reinterate that communicative levels are not defined by those behaviors per se but rather by the profile of communicative features that distinquish behaviors representative of different levels (see Dinnsen, 1989, for a similar principle in another developmental domain). This allows for variability in terms of behavioral inventories representative of a level. Specifically, other behaviors can be included at any level provided that they reflect the distinctive profile of features. As such, the model is particularly applicable to the assessment of children with handicaps because they may exhibit unique and often unconventional types of communicative behavior (Wilcox & Campbell, 1986). Therefore, although the model is derived from research with normally developing children, it has the potential to capture aspects of the performance of children with handicaps. This is an

important consideration in the development of an observational system for assessing communicative competence (Dollaghan & Miller, 1986). In general, the model has implications for assessment and intervention with children functioning at prelinguistic and early linguistic levels (Holdgrafer & Dunst, 1986; Salisbury, Britzman & Kang, 1989; Norris, 1991). The purpose of this study was to determine if young children appear to follow the proposed developmental sequence in the mastery of communicative competence and in what age range each level first appears and then is mastered.

METHOD

Subjects

Sixty-eight normally developing children were subjects. There were eight full-term newborns (4 girls, 4 boys) ranging from 1 to 3 days of age, and two children (1 girl, 1 boy) in each of the 30 1-month age intervals from 1 to 30 months of age. Subjects were obtained through the newborn nursery in the University of Alberta Hospital and by posting advertisements in local health centres in Edmonton, Alberta. Scores on the Denver Developmental Screening Test (Frankenburg & Dodds, 1967) were obtained for each child, except the newborns, following administration by nursing staff in the local health centres. For the younger children, the screening was completed sometime after they had participated in the study. All children tested obtained passing scores. Virtually all of the parents who agreed to participate had completed high school and a majority had a university degree. All children were considered to

be from middle class homes.

General Procedures

Each mother and child dyad were observed during a 20-minute play session either in the mother's hospital room, in the case of the newborns, or in a research laboratory with an adjoining observation booth at the University of Alberta. A standard set of toys was provided. The experimenter instructed each mother to play with her child, using the toys in any manner that was comfortable for her. The sessions were videotaped and time-coded. A trained observer, using the definitions in Appendix A, watched each videotape and coded communicative behaviors, using the observational format illustrated in Appendix B, according to level and function/intent and time of occurrence.

The approximate age ranges from Table 1 served as guides for determining each child's predominate communicative level. Based on a child's age, the earliest level scored was one level below[1] the expected predominate level. For example, the earliest level scored for a child 13 months of age was Instrumental communication because the expected predominate level was Triadic communication. Earlier levels were assumed to have been mastered by the child (Uzgiris & Hunt, 1975).

Reliability

A second observer (GH) independently scored the videotapes of 17 of the 68 subjects. The 17 subjects spanned the full range of communicative levels. Time of occurrence for each communicative behavior allowed for the determination of point-to-point

reliability (McReynolds & Kearns, 1986). The two observers' records were compared on a behavior-by-behavior basis. Reliability was determined for each communicative level. The number of agreements for each communicative level was totaled across subjects for which it was scored. Total agreements were divided by the total number of agreements and disagreements for that level and multiplied by 100. The median percentage of agreement was 92 (range = 86 to 100) These percentages indicate that adequate "recognition rules" for defining communicative behaviors had been developed (Dollaghan & Miller, 1986, p. 109).

Performance Criteria

A priori performance criteria were established for mastery of each level of communicative competence. In principle, a child was expected to manifest a number of different behaviors from a level and to use those behaviors a number of times during the sampling period (Bloom & Lahey, 1978; Hood, Lahey, Lifter, & Bloom, 1978). These two criterion were considered to be necessary evidence for stating with confidence, that a level was present and stable in the child's communicative repertoire. The specific "quantitative criteria" (McReynolds & Elbert, 1981, p. 198) were derived from related literature in speech and language acquisition and intervention. Given the amount of sampling, the need to avoid being overly stringent was recognized (Bloom & Lahey, 1978; Sander, 1972). Although low structured observation is the "predominant" method (Coggins, et al., 1987, p. 44) for studying children's communication development, the observation period is usually less

than one hour (Bloom & Lahey, 1978). Consequently, although performance criteria of 75-100% have been reported in intervention studies (see reviews by Fey, 1986; Olswang & Bain, 1985), children in this study were generally required to exhibit a minimum of 40% of the behaviors representative of a level. Criteria of 40-50% have also been used in intervention studies to indicate that a particular aspect of communication no longer of primary clinical concern (Fey, 1986, Olswang & Bain, 1985). The required minimum percentages varied slightly across levels due to differences in the total number of representative behaviors (Table 3). The representative behaviors for the level also had to appear in the highest percentage of the child's total communication acts. The actual percentages ranged from 38-100%.

Every behavior listed in Appendix A was observed in at least one child except for Engagement-Distress under Behavior State communication. Not all verbal categories were decontextualized, however, this may have been a function of the sampling method and will be discussed later. Other behaviors occurred infrequently (9 times) and always in cases where criteria were already met or where the additional other behavior was not sufficient to meet criteria. Consequently, they were not considered as part of the total number possible or used in the computation of percentages. The observation of virtually all exemplary behaviors, in conjunction with few other behaviors, indicates that the taxonomy was adequate for "capturing the phenomena of interest" in the children studied (Dollaghan & Miller, 1986, p. 109).

Insert Table 3

RESULTS AND DISCUSSION

Figure 1 contains the results according to age and communicative level. Three data points are provided for each level. The first point (A) indicates the age of the first Appearance of behavior(s) from the level. It represents the starting point for the gradual acquisition of the level. The second point (B) indicates the age when at least one child met the criteria for mastery. It represents the Basal age for mastery of the level. The third point (C) indicates the age when both children at the same age, and all subsequent children, mastered the level. This third point represents the Ceiling age or upper limit (Sander, 1972) for mastery of the level. The age range from B to C indicates continued predominace of the previous level for some children.

Insert Figure 1

It was necessary to eliminate the 40% minimum criterion for establishment of the age range for the Instrumental level. The eight children from 9 to 12 months of age typically demonstrated a very low quantity of communicative output sprinkled across Contingency, Instrumental and Triadic levels. They did not typically meet criteria for any level. Children in this age range do not routinely coordinate objects and people in social exchanges (Sugarman-Bell, 1978) which is a defining characteristic of Instrumental communication. Therefore, for these children, playing

with attractive toys appeared to be a "circumstance" (Dunst, 1978, p. 120) that reduced the likelihood of communicative behavior with mothers. Consequently, low quantity of communicative behavior during toy play with their mothers implies that these children were acquiring Instrumental communication. This was supported by maternal report in the form of a checklist. Mothers reported observing from one to four common Instrumental behaviors (e.g., extends arms, waves bye-bye). It is not unusual for mothers to witness certain behaviors in "consistent and natural contexts" that have not been observed during planned sessions (Bates, 1979, p. 84).

Only one child met both criterion for mastery by exhibiting at least 3 different Instrumental behaviors which appeared in 65% of the total number of communicative acts observed. The remaining children exhibited 1 or 2 instrumental behaviors. They were assigned to the Instrumental level if those behaviors appeared in the largest percentage of total communicative acts. Otherwise, they were assigned to Contingency communication. Triadic behaviors occurred with such minimal frequency that it was not reasonable to infer mastery of that level for any child from 9 to 12 months. Moreover, existing evidence clearly demonstrates that Triadic communication, characterized by coordinated object-person orientations, develops after Instrumental communication (Sugarman-Bell, 1978; Trevarthen & Hubley, 1978).

Five of the remaining 60 children failed to exhibit a sufficient quantity of communicative output to establish mastery

for any level. This resulted in an probable extension of the ceiling age for the Recognitory and Triadic levels by 1-2 months, because the five children fell into one or the other of the age ranges for those levels. This presumes that the children would have met criteria for those levels, given a sufficient sample of behavior. The criteria were not changed for these children because, in contrast to the children 9 to 12 months of age, there was no implication about communicative competence that could be drawn from the low quantity of output. No child met criteria for Verbal-decontextual communication. It occurred, with low frequency, in the children from 18-30 months of age. The use of attractive toys appeared to focus the dyads on the immediate context rather than on displaced topics (Holdgrafer & Dunst, 1990).

A comparison of horizontal lines and embedded data points across levels in Figure 1 provides support for the model of communication development described earlier. Specifically, there appears to be a sequentially ordered progression in the mastery of communicative levels that generally is both gradual and overlapping. All newborns met the criteria for behavior state communication and did not exhibit behavior representative of more advanced levels. First appearance of Recognitory communication probably occurred prior to 1 month of age and was therefore not observed. Thereafter, and not surprisingly, first appearance of behavior from each level was concurrent with basal age of the preceding level. Children meeting criteria for mastery of one level are expected to exhibit behavior from the next level. It was also

typical for children to exhibit behaviors from the level immediately below their predominate level. Basal age for each level followed closely behind ceiling age for the previous level. The uniform 1-month lag across levels is probably an artifact of the insufficient sample of data obtained from the five children at the Recognitory or Triadic levels as mentioned above. The age ranges for each level generally approximate those proposed in Table 1. There was no consistent pattern favoring boys or girls in achieving mastery of levels. Overall, girls produced significantly greater communicative output than boys and verbal children produced significantly greater communicative output than preverbal children (Holdgrafer, 1991).

It should be noted that these data are cross-sectional rather than longitudinal. Observations of differences between subjects of different ages were made in order to generalize about developmental changes that would occur within subjects with the passage of time (Ventry & Schiavetti, 1980). Longitudinal data directly show how subjects develop while they are actually aging. A cross-sectional plan was utilized given the limited willingness of parents to participate on a longitudinal basis.

Information gained from the observation of behaviors representative of progressively more complex communicative levels can be used to compare a child with other children, either to assist in determining if a significant problems exists or to determine goals for intervention (Dollaghan & Miller, 1986). Caution should be exercised in the use of the age ranges for determining the presence

of a developmental delay. Similar to other developmental research (Miller & Chapman, 1979) these data are from a relatively small sample of middle-class children from one urban centre and may differ for children from other populations. The age ranges should not, therefore, be used as the only or primary indicator of developmental delay. Children who have exceeded the upper limit for mastery of any level should be considered for further evaluation.

Communicative behavior obviously varies as a function of the characteristics of the observational context (Dollaghan & Miller, 1986). Twenty minutes of mother-child, toy play interaction in a laboratory setting was sufficient for determining the predominate communicative level for most, but not all children, using criteria based on limited sampling. Those children who exhibited very low communicative output were undoubtedly more communicative with their mothers at home (Bates, 1979; Lonigan & Curry, 1991). The same sampling procedure may not be sufficient for determining the predominate level of many developmentally delayed children because they have been observed to exhibit reduced communicative output (Field, Dempsey, & Shuman, 1981; Hubatch, Johnson, Kistler, Burns, & Moneka, 1985; Warren & Kaiser, 1986). Moreover, the use of attractive toys appears to be contradictory to the nature of Instrumental and Verbal-Decontextual communication. Also, the frequency of occurrence of termination behaviors, specifically rejects, was extremely low (Holdgrafer & Dunst, 1990) probably because of maternal avoidance of situations during play interaction that would prompt a child to express that intention (Carpenter,

Mastergeorge & Coggins, 1983).

Observation of play interaction as an informal method (Rossetti, 1991) can be part of an initial assessment of children with possible developmental delay. However, more extensive sampling across a number of contexts will be required to determine the range of behaviors representative of a predominate level and generality of their use. This information is essential for specifying intervention goals suggested by the model (Holdgrafer & Dunst, 1986; Norris, 1991). Contexts are selected or structured based on the type of information required (Dollaghan & Miller, 1986). Included should be low structured adult-child interaction with toys (Coggins, et al., 1987; Holdgrafer & Dunst, 1990; 1991) and without toys (Bedrosian & Willis, 1984) as well as structured elicitation tasks (Coggins et al., 1987), particularly for termination behaviors (Holdgrafer & Dunst, 1990). For older children, Verbal-decontextualized communication is promoted by play involving routine events (e.g., dressing, eating) because of shared event knowledge that includes situationally appropriate entities and activities not part of the immediate context (Lucariello, Kyratizis & Engel, 1986). Assessments done within the context of a school program might be most informative if the examiner plays the dual roles of observer/participant across activities (Salisbury et al., 1989).

The above contexts are recommended as necessary for obtaining information about the various communicative competencies incorporated in the model. Observations should be aided with video-

tape because the recognition rules are sufficiently complex to make on-line scoring difficult (Dollaghan & Miller, 1986). The observational format in Appendix B allows for easy checking of behaviors as they occur. It yields, for each context, total communicative acts and an inventory that can include both conventional and unique, unconventional communicative behaviors. This should allow the clinician to determine the child's predominate communicative level and to determine goals that can include an increase in quantity, diversity, conventionality and complexity of communicative performance.

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FOOTNOTE

1. Both Triadic and Verbal-Contextual communication was scored for children 24 to 30 months because of a seperate research question addressing developmental changes in intentional communication (Holdgrafer & Dunst, 1990).

Table 1. A Prototypic Model for Classification of Infant Communicative Behavior

Level	Age (Months)[a]	Type of Communication	Classificatory Features[b]					
			Awareness	Goal Directed	Conventional	Intentional	Rule Governed	Symbolic
I	0-1	Behavior State	-	-	-	-	-	-
II	1-4	Recognitory	+	-	-	-	-	-
III	2-8	Contingency	+	+	-	-	-	-
IV	6-12	Instrumental	+	+	+	-	-	-
V	8-14	Triadic	+	+	+	+	-	-
VI	12-24	Verbal - Contextual	+	+	+	+	+	-
VII	16-30	Verbal - Decontextual	+	+	+	+	+	+

[a] Age ranges initially derived from developmental literature

[b] Awareness refers to the child's ability to discriminate between stimuli and to behaviorally display that ability (Cohen, Deloache & Strauss, 1979).

Goal-directed refers to the child's ability to attain a goal or end state through sustained interactions with the environment (Lamb, 1981; Suomi, 1981; Watson, 1979).

Conventional refers to the child's ability to use conventional behavior that is easily recognized and correctly interpreted by anymember of the child's community (Dore, 1979; Mayo & LaFrance, 1978).

Intentional refers to the child's ability, not only to access a goal directly, but also to use some intermediary behavior as a signal to indicate the goal to someone else (Bates, 1976; Scoville, 1984; Sugarman-Bell, 1978).

Rule-Governed refers to the child's ability to use a conventional system of signals, the form of which reflect an underlying set of rules that govern their construction (Bloom & Lahey, 1978).

Symbolic refers to the child's ability to use symbols or signs (e.g., symbolic play, drawing) to represent previous or future events or occurrences in the absence of perceptually present stimuli (Piaget, 1951).

Table 2. Levels of Communicative Competence

Behavior State communication refers to conditions in which communicative intent is imputed to the child's nonverbal behavior during states of arousal, between state changes, and as a result of modulation of behavior between states. For example, cessation of crying upon being picked up may be interpreted as meaning the child wants to be held. The child's communicative competence at this level is distinguished from all other levels by an absence of each of the six features. The child is considered communicative only in the sense that child behavior arouses in the adult a belief that the child is attempting to communicate.

Recognitory communication acts are behaviors that permit onlookers to infer the child's recognition of persons, objects and events. These behaviors are considered recognitory because they are manifested in the presence of familiar entities and persons (Brown, 1979) and thus reflect an awareness or memory of pleasant (or unpleasant) experiences occurring in the course of previous interactions with the social and nonsocial environment (Lamb, 1981). Consequently, the child's communicative competence at this level is characterized by the feature of awareness.

Contingency communication acts are operant behaviors of a child that function to initiate and sustain the attention or behavior of another person. These behaviors reflect a clear anticipation of an outcome and specifically involve self-initiated actions "to regain interesting perceptual inputs" (Uzgiris & Hunt, 1975, p.116). Contingency communication behaviors typically emerge

in the context of lap games (Field, 1979) where they are interpreted by the adult as requests to repeat the game. They are for the most part idiosyncratic and most often "understood" by adults familiar with the child. It is unlikely that these behaviors are used intentionally for communication, given that the child does not have an understanding of others as agents (Olswang & Carpenter, 1982). Therefore, the child's communicative competence at this level is characterized by the features of awareness and goal-directedness.

Instrumental communication acts are socially recognized and culturally defined, nonverbal behaviors that are used as a means to attain a preselected goal or state. The behaviors are now conventional rather than idiosyncratic and thus, are more easily interpreted by any member of the child's cultural community. There is, however, a lack of any effort of the child's part to coordinate objects and people into social exchanges (Sugarman-Bell, 1978) through the use of intermediary behaviors (looking at the adult while pointing to an object) that clearly reflect the child's understanding that the adult can be used as a means to obtain a desired object or that an object can be used to gain adult attention. Therefore, the child is not credited with the full capacity for intentional communication (Bates, Benigni, Bretherton, Camaioni, & Volterra, 1979).

Triadic communicative acts are intentionally used, socially recognized and culturally defined nonverbal behaviors that involve the child's use either of an object to operate on adult attention or the use of an adult as an intervening agent to obtain a desired

object. The coordination of objects and adults in social exchanges through the use of intermediary behaviors such as looking at the adult and pointing to an object is considered a clear indication of intentionality in communication (Bates et al., 1979). At this level, specific categories of intent; rejecting, requesting and commenting (Chapman, 1981), are distinguished in the child's behavior.

Verbal-contextual communication acts are socially recognized and culturally defined words (and word combinations) that are used as signs or symbols to express the intentions of rejecting, requesting and commenting. These intentions are expressed in reference to preceptually present entities or the "here and now" (Grieve & Googenraad, 1979). The words may be expressed verbally or by some other conventional system of signals such as sign language. In any case, there are a finite number of elements (e.g., sounds, signs) which are combined into meaningful messages according to a set of cognitive-linguistic rules (Bloom & Lahey, 1978).

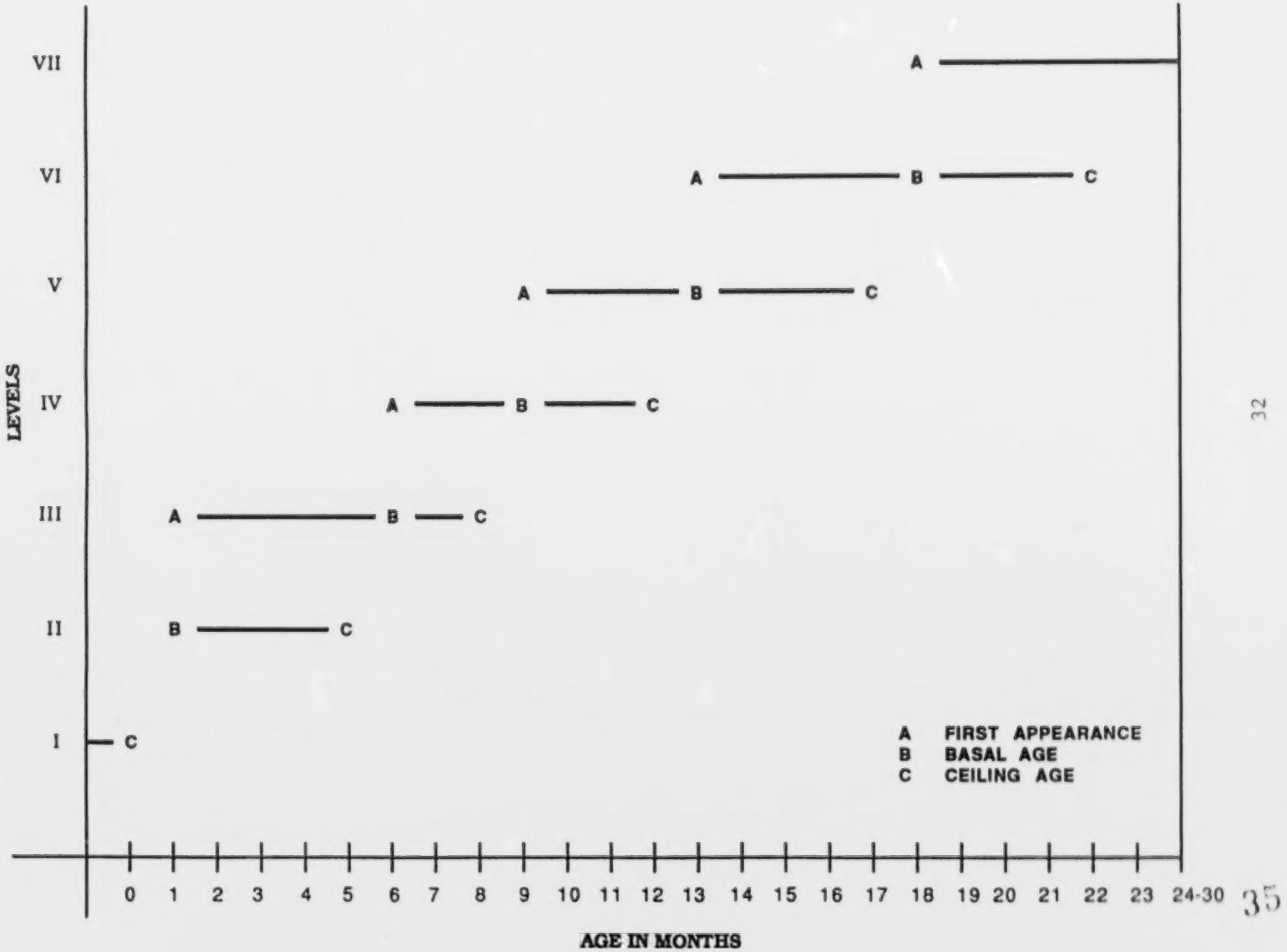
Verbal-decontextual communicative acts are socially recognized and culturally defined words (and word combinations) used as signs or symbols to express communication intentions about entities displaced in time and space. Decontextual communication acts may be prompted by perceptually present objects, which serve to remind the child of displaced entities, or have no perceptually present referent (Olzewski & Fuson, 1986). They differ from verbal-contextual communicative acts only with respect to the symbolic feature. At the preceding level, the child's communication is restricted to the immediate context. This level of communication

represents the special case of the symbolic function (Piaget, 1951), in which the signs are part of a conventional communication system as opposed to being personalized symbols such as those used symbolic play.

Table 3. Minimum number and percentage of behaviors required for mastery of each communicative level

Level	Number of Behaviors	Percentage
Behavior State	3/7	43
Recognitory	2/5	40
Contingency	4/9	44
Instrumental	3/8	38
Triadic	5/11	45
Verbal-Contextual	5/12	42
Verbal-Decontextual	5/12	42

Figure 1. Age range estimates for mastery of communication levels



APPENDIX A

OPERATIONAL DEFINITIONS OF COMMUNICATIVE BEHAVIORS

Behavior State Communication

Termination Behaviors

Drowsiness. The child yawns or nods off during attempts by the adult to engage him/her.

Distress. The child cries or is fussy

a) in response to an action of adult (e.g., wiping child's face, changing child's body position) or,

b) in the absence of any clear precipitating event but where efforts by the adult are required to quiet the child.

The child does not visually attend to the adult or offending object (tissue) during either type of distress episode.

Engagement Behaviors

Distress. The child cries when the adult removes some object (e.g., bottle) but does not visually attend to the adult or the object.

Quiets. The child quiets following a distress episode when the adult provides soothing and comforting. The child appears to relax and cuddle.

Alerts. The child widens eyes in response to some action or object provided by the adult.

Orients. The child turns head to

a) follow an object that the adult has moved from the immediate visual field or,

b) follow the sight/sound of the adult.

Roots/Sucks. The child opens mouth, turns head from side to side and makes sucking movements after the adult has removed nipple or pacifier.

Recognitory Communication

Termination Behaviors

Cries. The child cries/makes angry fussing sounds and may posture (turn or back away) upon seeing something unpleasant (e.g., adult holding washclothe or spoon with medicine).

Crying/fussing may also occur in the absence of any clear precipitating event but efforts are required on the part of the adult to comfort the child or engage the child in a pleasant activity. The child is generally visually attentive to the offending object or to the adult during the episode.

Engagement Behaviors

Cries. The child cries (or makes angry fussing sounds) upon removal by the adult of some object (e.g., bottle) and visually attends to the object or adult.

Smiles/Laughs. The child smiles/laughs

a) when the adult performs some simple game (e.g., tickling the child, making faces and sounds) or,

b) upon seeing a familiar adult, object or event.

Vocalizes. The child vocalizes in response to a/b above.

Uses Body Movements. The child exhibits increased body movement (e.g., waving arms, kicking legs) or cessation of body movements in response a/b above.

Contingency Communication

Termination Behaviors

Averts Gaze. The child looks away from the adult very abruptly as the adult attempts to engage him/her.

Pushes Away. The child pushes an object away that has been offered by the adult.

Engagement Behaviors

Repetitious Smiling/Laughing/Vocalizing/Body Movement. The child produces one or more of these behaviors repeatedly during sustained interaction with the adult (e.g., tickling). These behaviors appear to be goal-directed toward keeping the adult engaged.

Uses Procedures. The child exhibits bodily excitement (e.g., waving arms, kicking legs) during pauses in engagement by the

adult (e.g., adult tickles child and pauses, child exhibits procedures, adult tickles and pauses again).

Vocalizes. The child vocalizes during pauses in engagement by the adult as above.

Uses Reciprocal Gestures. The child exhibits game-specific gestures during pauses in the game (e.g., clapping hands in a game of patty-cake).

Instrumental Communication

Termination Behaviors

Shakes Head No. The child shakes head from side to side when the adult attempts to engage him/her.

Engagement Behaviors

Shakes Head No/Yes. The child shakes head from side to side when the adult terminates an interaction or shakes head up and down to encourage engagement (e.g., caretaker says "I'm going to get you").

Extendes Arms. The child extends both arms up to the adult in order to be picked up.

Gives Affection. The child hugs, kisses or in some way expresses affection to adult.

Waves Hi/Bye. The child waves to adult upon arrival/departure.

Shows Off. The child performs a simple repetitive activity (e.g., banging a spoon on high chair tray) while looking at the adult and smiling/laughing.

Points. The child extends finger on hand of outstretched arm toward an object but does not look at the adult.

Looks Referentially. The child looks at adult, looks at an object and then looks back at the adult but does not indicate the object in any other way (e.g., pointing to it).

Triadic Communication

Termination Behaviors

Reject

Uses Vocable. The child looks at the adult and produces an isolated sound or syllable in an angry voice when the adult attempts to engage him/her.

Uses Ridding Gesture. The child looks at adult and uses a negative gesture (swiping, throwing, hitting) when the adult offers an object to him/her.

Engagement Behaviors

Request

For the following behaviors, the child clearly waits for a response from the adult that either involves supplying the child with the desired object or performing some action with an object (e.g., activating a wind-up toy).

Uses Vocable. The child looks at adult and produces an isolated sound or syllable in a persistent manner when adult is holding a desired object.

Points. The child looks at adult and extends finger on hand of outstretched arm toward an object.

Reaches. The child looks at adult and extends arm and hand toward object.

Leads. The child takes the adult's hand and pulls toward an object. Looking at the adult is not necessary because the act of leading clearly indicates a coordination of adult and objecty.

Gives. The child holds object out for adult to take. Looking at the adult is not necessary as above.

Comment

In contrast to request behaviors, the child does not wait for a response from the adult. The child may typically continue to play with a object after bringing it to the adult's attention or may turn to another object.

Uses Vocable. The child looks at the adult and produces a single sound or syllable corcurrent with an interesting event (e.g., child has successfully activated a wind-up toy).

Points. Child looks at adult and extends finger on hand of outstretched arm toward an object or event.

Shows. The child looks at adult and holds up an object.

Gives. The child holds out an object for the adult to take. Looking at the adult is not necessary as explained earlier.

Verbal-Contextual Communication

Termination Behavior

Reject

Says No. The child says No or equivalent word (e.g. "stop") when the adult attempts to engage him/her.

Engagement Behavior

Requests

Names Object or Person. The child produces a recognizable word to request desired object or person (e.g., "juice", "mommy").

Names Concept Related to Object or Person. The child produces a recognizable word to make a request related to an object or person as described below.

a) Feature or Attribute (e.g. "big one")
b) Possession (e.g., "mine" while reaching for object)
c) Location (e.g. "up")
d) Action (e.g., "pour")
e) Reoccurence (e.g., "more" to request additional quantity)

Names State of Being. The child uses a recognizable word to make a request related to a desired state of being. These can include

a) Internal States (e.g. "me want", "sleep")
b) Perceptional States (e.g., "see", "look")

Words from 1, 2 and 3 above can be combined into multiword utterances that incorporate each of the categories.

Personal-Social Expressions. The child says "please" to make a request.

Says Yes/No. The child says No when the adult attempts to terminate an activity or Yes to indicate an interest in an activity that is offered.

Asks Questions. The child asks questions such as "what's that?" in order to obtain information.

Comment

Names Object or Person. The child produces a recognizable word to draw the adult's attention to an object or person (e.g., "daddy").

Names Concept Related to Object or Person. The child produces a recognizable word to draw the adult's attention to some characteristic of an object or person as described below.

a) Feature or Attribute (e.g., "hot")
b) Possession (e.g., "mine" while holding up object)
c) Location (e.g., "up there")
d) Action (e.g. "fall")
d) Disappearance (e.g., "allgone")
e) Reappearance (e.g., "more" to comment upon finding an additional quantity of something)

Names State of Being. The child produces a recognizable word to draw attention to his/her current state of being. This can include

a) Internal State (e.g., "hurt")
b) Perceptual State ("see")

Words from 1, 2 and 3 can be combined into multi-word utterances that incorporate each of the categories.

Personal-Social Expressions. The child says "hi" and "bye" to call attention to self and others.

Says Yes/No. The child says No or Yes to confirm or deny a comment made by another person such as "your being silly".

Verbal Communication-Decontextual

The categories are the same as above except that the words are used in reference to objects and persons displaced in time and space. Decontextual communication acts may be prompted by perceptually present stimuli or have no perceptually present reference.

Appendix B
Observational Format for Behavior Coding

Name:
DOB:
Date:

Levels

Time of Occurrence	I				II				III				IV			
	Termination		Engagement		Termination		Engagement		Termination		Engagement		Termination		Engagement	
	A[a]	Other[b]	A[a]	Other[b]	A[a]	Other[b]	A[a]	Other[b]	A[a]	Other[b]	A[a]	Other[b]	A[a]	Other[b]	A[a]	Other[b]

Appendix B (cont.)
Observational Format for Behavior coding

V						VI						VII					
Termination		Engagement				Termination		Engagement				Termination		Engagement			
Reject		Request		Comment		Reject		Request		Comment		Reject		Request		Comment	
A[a]	Other[b]	A[a]	Other[b]	A[a]	Other[b]	A[a]	Other[b]	A[a]	Other[b]	A[a]	Other[b]	A[a]	Other[b]	A[a]	Other[b]	A[a]	Other[b]

a provide a column for each behavior from Appendix A

b specify or describe Other behavior